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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,271	09/28/2005	Masahiro Tada	09792909-6378	4665

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EXAMINER	
TSAI, H JEY	

ART UNIT	PAPER NUMBER
2895	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,271	TADA ET AL.	
	Examiner	Art Unit	
	H J. TSAI	2895	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 May 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4 recites the limitation "performing sacrificial-layer which removes sacrificial layer …." in claim 1. There is insufficient antecedent basis for this limitation in the claim. Note: there are first and second sacrificial layers in claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouellet 6,635,509, previously cited, in view of Potter 2002/0131228, newly cited, Brunner 2005/0221528, and Wolf, vol. 1, pages 331-332, previously cited.

The references teach the feature:

Ouellet discloses a method for manufacturing a micromachine, comprising the steps of:

forming a lower wire (a 0.45 um polysilicon), figs. 13, 14b-14l, col. 9, lines 45-67, col. 10, lines 1-67 (some of fig. 14's first steps are exact copies of cited prior art, see col. 10, lines 48-49), col. 1, lines 5-44, and see fig. 12, para. 11 of Potter: base layer 38 with conductive material 16(1),

forming a first (lower) sacrifice layer comprising silicon dioxide and covering a top surface of the lower wire (polysilicon), fig. 13, 14f, and see fig. 12 of Potter: first sacrificial layer 44, and see para. 10 of Bruner: preferably the silicon oxide is silicon dioxide,

forming an oscillator (ISDP, moving component of MEMS, resonator, actuator) on a portion of the first sacrifice layer, figs. 14h-14i, col. 9, line 66 to. Col. 10, line 2, and see fig. 12 of Potter: an oscillator beam 18,

forming a second (upper) sacrifice layer on the top and side surfaces of the oscillator (ISDP, MEMS, resonator, actuator), figs. 14k-14l, and see fig. 12 of Potter: second sacrificial layer 58,

the second (upper) sacrifice layer comprising silicon oxide, col. 11, line 63 to col. 12, line 35, and see para. 10 of Brunner: preferably the silicon oxide is silicon dioxide,

covering the exposed portion of first and second sacrifice layers with an overcoat film (encapsulation structure), fig. 14m,

followed by the formation of a penetrating hole extending through the overcoat film to reach the first sacrifice layer, fig. 14n, col. 13, lines 5-67, and see figs.2A-2B, 12, 14, para. 37 of Potter: holes can be formed through other materials (overcoat) 64 to the first sacrificial material 44 and second sacrificial layer 58,

performing sacrifice-layer etching for removing the sacrifice layer using the penetrating hole in order to form a space around the movable portion, figs. 14o, 14p, col. 13, lines 5-67, and see fig. 13 of Potter,

performing a film-formation treatment at a reduced pressure (vacuum and sputtering) following the sacrifice-layer etching so as to form a sputtering layer that seals the penetrating hole which is formed into at least one upper wire (interconnects) over the overcoat film (encapsulation), figs. 14q-14t, col. 14, line 1-67, and see figs. 2A-2B, 12, 14, para. 20, 39: aluminum contact plug 19 or 68, contact electrode 22(2),

wherein the sputtering layer is composed of one selected from the group of an aluminum copper film and an aluminum silicon film (aluminum alloy, Al-Cu, col. 14, lines 21-22, col. 11, lines 11-25), col. 14, line 21-67, and see Wolf teaches at vol. 1, pages 331-332, aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application.

Regarding claim 2, wherein the method is applied to a micromachine having means for driving oscillation in the oscillator, para. 26, 46 of Brunner.

The difference between the references applied above and the instant claim(s) is: Ouellet teaches using aluminum alloy (Al-Cu) for film-formation treatment in vacuum to seal the penetration hole and forming interconnects over covering layer. However, Potter teaches at figs. 2A-2B, 12, 14, para. 37, forming penetrating holes through overcoat 64 to the first sacrificial material 44 and second sacrificial layer 58. Bruner also teaches at para. 10, preferably the silicon oxide is silicon dioxide; when silicon oxide is referred to in this document, silicon dioxide is the most preferred embodiment,

although conventional, doped and/or non-stoichiometric silicon oxides are also contemplated. Brunner teaches at para. 46, 50, 60, the film-formation treatment at a reduced pressure is a film-formation treatment by sputtering aluminum to seal the penetration hole. Wolf teaches at vol. 1, pages 331-332, aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application because they posse enhanced properties for interconnect requirement.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above Ouellet's teachings' process by forming a through hole to the first sacrificial layer as taught by Potter so that both first and second sacrificial layers can be moved with an etching solution through the through hole.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using silicon dioxide layer, a circuit for driving the MEMS oscillator/actuator and using sputtering for forming aluminum alloy as taught by Brunner because silicon dioxide is most common form of silicon oxide, and oscillator/actuator can be a functional device by connecting to a driving circuit, and sputtering metal deposition is a common process in the semiconductor industry.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above Ouellet's teachings' sputtering aluminum alloy by using sputtering deposition for metal deposition and using conventional aluminum alloy including aluminum copper or aluminum silicon for metal film formation as taught by Wolf et al. because both aluminum copper and aluminum silicon posse enhanced

properties for interconnect requirement in microelectronic application so that all metal layers in the microelectronic mechanical device would have enhanced aluminum property.

Claims 3-4 are rejected under 35 U.S.C 103 as being unpatentable over Ouellet in view of Potter, Brunner and Wolf as applied to claims 1-2 above, and further in view of Zurn 6,621,134, and Schmid 6,761,068, previously cited, and Carley 7,008,812, newly cited.

The difference between the references applied above and the instant claim(s) is: Quellet in view of Potter, Brunner and Wolf et al. teaches forming a MEMS device having an oscillator but does not teach the means for driving the oscillation. However, Zurn teaches at figs. 4A-4B, 10, 11, 14, 15, 19, an electrostatic capacitive MEMS structure for driving a resonator (oscillator) and sealing penetration hole 144 with metal. Schmid teaches at col. 4, lines 1-12, means for driving oscillation are static electric or piezoelectric. Carley teaches at figs. 8B, 9A-9B, col. 1, lines 18-67, col. 3, lines 20-67, co. 5, lines 20-47, forming interconnect layer (wiring) 26 over covering layer to contact pad with CMOS circuit for driving MEMS accelerometer/oscillator

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using static electric or piezoelectric for driving oscillation as taught by Zurn and Schmid because static electric and piezoelectric would cause the movable portion of the device to oscillate so that a oscillation is formed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by forming a circuit for driving the MEMS oscillator/actuator as taught by Carley so that oscillator/actuator can be a functional device.

Conclusions

Applicant's arguments filed May 3, 2011 have been fully considered but they are not persuasive.

Newly cited reference Potter teaches at figs. 2A-2B, 12, 14, para. 37, forming penetrating holes through overcoat 64 to the first sacrificial material 44 and second sacrificial layer 58 and forming wiring (control electrode) 22(2) over the overcoat film 64 as set forth above.

Bruner at para. 46, performing a film-formation treatment by sputtering to seal the penetration hole under vacuum, hence, it clear that Bruner teaches performing a film-formation treatment by sputtering at a reduced pressure.

And, a combination of familiar elements according to know methods to yield predictable results is obvious. Agrizap, Inc. V. Woodstream Corp., 520 F.3d 1337, 86 U.S.P.Q. 2d 1110 (Fed. Cir. 2007).

Ouellet teaches forming an aluminum wiring (interconnects) in vacuum over the overcoat film, Potter teaches forming penetrating holes through overcoat to the first sacrificial material and second sacrificial layer and forming wiring (control electrode)

over the overcoat film Bruner teaches using sputtering aluminum for film-formation treatment in vacuum to seal the penetration hole, Wolf teaches aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application, Zurn teaches an electrostatic capacitive MEMS structure for driving a resonator (oscillator) and sealing penetration hole with metal. Schmid teaches means for driving oscillation are static electric or piezoelectric, Carley teaches forming a driving CMOS device for connecting to the wiring (interconnects) formed over the overcoat layer, hence the combination of Ouellet, Potter, Bruner, Zurn, Schmid and Carley is proper. Therefore, it is clearly that the combination of Ouellet, Potter, Bruner, Zurn, Schmid and Carley meets the doctrine of U.S. Supreme Court in KSR international v. Teleflex of "a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability". And, it is also clearly that the combination of Ouellet, Potter, Bruner, Zurn, Schmid and Carley meets the doctrine of U.S. Supreme Court in KSR international v. Teleflex of "If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under §103". Also see MPEP §2143.

It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle. See KSR international v. Teleflex, US Supreme Court, 127 S.Ct. 1727 (2007). And, see Ball Aerosol v. Limited Brands, Inc.,

555 F.3rd 984, 89 U.S.P.Q. 2d 1870 (Fed Cir. 2009). Boston Scientific Scimed, Inc. v. Cordis Corp., 554 F.3d 982, 89 U.S.P.Q. 2d, 1704 (Fed. Cir. 2009).

More details of U.S. Supreme Court in KSR international v. Teleflex, US Supreme Court, 127 S. Ct. 1742, 82 USPQ 2d at 1390. Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under §103.

When a work is available in one field, design incentives and other market forces can prompt variations of it, either in the same field or in another. If a person of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, §103 likely bars its patentability. Moreover, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill.

It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of

multiple patents together like pieces of a puzzle. See KSR international v. Teleflex, US Supreme Court, 127 S.Ct. 1727 (2007).

In *Sakraida* v. *AG Pro, Inc.*, 425 U. S. 273(1976), the Court derived from the precedents the conclusion that when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious. *Id.*, at 282. The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from: Monday: 7:00 am-4:00 pm; Tuesday & Wednesday are off; Thursday: 7:00am- 4:00pm; Friday: 7:00 am-11:00am.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Richards, 571-272-1736.

The fax phone number for this Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/H.Jey Tsai/
Primary Examiner, Art Unit 2895
6/13/2011